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Citizenship: Canadian

Research Interests: Environmental Macroeconomics, Public Finance

Education

Ph.D. in Economics, *University of Toronto* Expected 2026
Committee: Joseph Steinberg (Co-supervisor),
Eduardo Souza-Rodrigues (Co-supervisor), Gueorgui Kambourov
M.A. in Economics, *University of Toronto* 2018
Hons. B.Sc. in Economics and Statistics, *University of Toronto Scarborough* 2017

Working Papers

Optimal Carbon Taxation Under Carbon Inequality (Job market paper)
The Impact of the Russia-Ukraine War on Renewable Energy
with Álvaro Pinzón

Works in Progress

Clean Energy Transition Paths under Structural Change
with Anubha Agarwal and Álvaro Pinzón
Optimal Income Taxation Under a Climate Externality
Estate Taxation and Wealth Inequality

Awards and Grants

Ontario Graduate Scholarship 2023, 2024
University of Toronto Doctoral Fellowship 2019 - 2024
University of Toronto Faculty of Arts and Sciences Graduate Admission Award 2017
UTSC Department of Management Wan Ho Chak Scholarship 2016

Professional Experience

Teaching Assistantships

2016 - Present

- ECO1100 - Macroeconomic Theory (Graduate)
- ECO1960 - Energy and Regulation (Graduate)
- ECO313H - Environmental Economics and Policies (Undergraduate)

- ECO101 - Principles of Microeconomics (Undergraduate)
- ECO102 - Principles of Macroeconomics (Undergraduate)
- PPG1004 - Quantitative Methods for Policy Analysis (Undergraduate)
- ECO220 - Quantitative Methods in Economics (Undergraduate)
- MGEC06 - Topics in Macroeconomic Theory (Undergraduate)
- MGEC02 - Topics in Microeconomic Theory (Undergraduate)

Research Assistantships

- Michelle Alexopoulos: Data collection and labour productivity analysis 2024
- Heski Bar-Isaac: Model analysis and verification 2022–2023
- Ambarish Chandra: Data analysis 2021–2023
- Burhanettin Kuruscu: Model estimation 2021
- Nathanael Vellekoop: Data analysis 2020
- Gustavo Bobonis & Marco Gonzalez-Navarro: Data preparation 2018–2019
- Marco Gonzalez-Navarro: Data preparation and analysis 2016–2018

Conference Presentations

- Annual Conference of the Canadian Economics Association 2025
- Environmental Economics Workshop (Ivey Business School) 2024

Languages

English (native), Bengali (intermediate), French (basic)
Programming: Fortran, Python, Stata, R, Julia, MATLAB, QGIS, VBA, JavaScript

Academic Service

- Department of Economics, CUPE Steward 2020 - 2023

References

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Abstracts

Optimal Carbon Policy under Carbon Inequality

(Job Market Paper)

Rich households generate a disproportionate share of carbon emissions, particularly after accounting for their emissions from both consumption and investment. I develop a quantitative general-equilibrium model with heterogeneity in wealth and emissions from production and consumption to design carbon policy under a fixed abatement target. Three instruments deliver the same abatement: (i) a tax on "basic" household energy usage, (ii) a shareholder-facing tax on production emissions, and (iii) a uniform tax on all emissions. The trade-offs are sharp. A production-emissions tax contracts GDP and wages yet raises welfare the most for all wealth groups and reduces carbon inequality. A basic-good tax is the only instrument increasing GDP but delivers the lowest welfare, increasing carbon inequality. A uniform tax delivers small welfare gains but GDP falls the most. I then implement a tax on "luxury dirty goods" consumption that only affects rich households. It delivers little abatement yet curbs carbon inequality. The optimal policy mix with different rates on production and consumption emissions yields better economic outcomes and higher welfare than a uniform carbon tax achieving the same level of abatement.

The Impact of the Russia-Ukraine War on Renewable Energy

with Álvaro Pinzón

Global adoption of renewable energy has increased rapidly since the early 2000s, in part due to learning-by-doing externalities. Despite this adoption, the world falls short of net-zero goals by 2030. This paper investigates if the outbreak of the Russia-Ukraine war accelerated Europe's clean transition via a supply shock. The European Union relied heavily on Russia to fulfill its fossil fuel demands, particularly natural gas, for electricity generation purposes. Countries vary in their exposure to Russian gas, experiencing the supply shock at differing intensities. In this paper, we first exploit the variation in import exposure to Russian gas and find empirical evidence that more dependent countries experienced quicker transitions post-war relative to their less-exposed counterparts. As long-term effects cannot be captured through an empirical analysis, we develop a neoclassical growth model embedding dirty and clean energy to account for general equilibrium effects in the presence of heterogeneous fossil fuel dependency. We find that a permanent fossil fuel supply shock advances the clean transition by four to six periods. This is driven by higher electricity prices due to energy scarcity increasing the returns to investment in renewable electricity capital, reinforced by a boost in the learning-by-doing mechanism. In contrast, the fossil fuel supply shock reduces the productivity and returns to investing in fossil fuel capital.

Clean Energy Transition Paths under Structural Change

with Álvaro Pinzón and Anubha Agarwal

The transition to clean energy is an imperative element of sustainable growth. How are the incentives to invest in the transition to clean energy affected by a country's stage of development? To answer this question, we link clean energy transitions to the process of structural change. We provide evidence of differential emission levels and clean transition rates between economies at different development stages. We highlight how the process of structural change can impact the proportion of clean vs. dirty energy using a closed economy model of structural change with two final sectors, manufacturing and services, and an intermediate energy sector. Energy can be dirty or clean, and the government invests in energy efficiency and in building renewable energy capacity. We show that economies at different stages of development invest different amounts for transitioning to clean energy since the benefits from the transition are higher when a higher proportion of GDP comes from energy-intensive sectors.

Optimal Income Taxation under a Climate Externality

This paper studies how income dispersion and the income elasticity of household emissions shape the desirability of progressive versus regressive income taxation when carbon damages are present and direct carbon pricing is not possible. I embed a climate block that links emissions to income through a reduced-form environmental Engel curve into a partial-insurance framework with endogenous skill investment, elastic labour supply, and a publicly provided good. The government chooses the degree of progressivity or regressivity of the labour income tax system. Using closed-form expressions for social welfare, I show that when emissions rise faster than income, progressivity reduces both inequality and aggregate emissions and is unambiguously welfare-improving. When emissions rise more slowly than income, the climate channel weakens. Progressivity still redistributes income but delivers limited emission gains as it compresses the incomes of high earners who emit less per dollar of income. These results demonstrate how income-tax progressivity can act as a climate policy instrument in the absence of direct carbon pricing.

Estate Taxation and the Rise of Wealth Inequality

(Second Year Paper)

Over the last 40 years, the U.S estate taxation structure underwent changes that reduced its progressivity, allowing larger estates to pass on their wealth tax-free. Over the same time period, wealth inequality has risen. This paper will use a quantitative model to gauge the effect this reduced progressivity had on wealth concentration. The model matches the distribution of bequests given and dollars transferred in the data, although it cannot generate extreme wealth concentration. I find that rolling estate taxes back to their 1972 values lowers the share of wealth accruing to the top 0.5% 1%, 5%, and 10% of wealth. The share of wealth accruing to the top 0.1% slightly rises.